CASE STUDY

Resolution of Failure to Thrive and Kinematic Imbalance due to Suboccipital Strain (KISS) Symptomatology in an Infant Following Chiropractic Care to Reduce Vertebral Subluxation: A Case Report

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ABSTRACT

Objective: To describe the management and resolution of failure to thrive and KISS symptomatology in an infant.

Clinical Presentation: A four-month-old male with a medical diagnosis of failure to thrive was presented for care. History revealed inadequate weight gain, severe allergies, and excessive crying beginning two weeks after birth.

Intervention and Outcome: The patient received chiropractic adjustments to reduce vertebral subluxation using an Atlas Orthogonal Instrument. Over 3.5 months of care, the patient's atlas was adjusted six times. All prior symptoms resolved, the patient gained weight, and within six weeks of care, his body became symmetrical.

Conclusion: Following chiropractic care to reduce vertebral subluxation, all symptoms resolved in this patient. Further research is needed in this area to determine the relationship of upper cervical spine misalignment and failure to thrive.

Keywords: *Chiropractic, Atlas Orthogonal, upper cervical, failure to thrive, vertebral subluxation, adjustment, allergies*

Introduction

Excessive crying and fussiness in an infant are concerning to even the most seasoned parent. Colicky babies are often diagnosed according to the 'Rule of Threes': irritability, fussiness, or crying, lasting longer than three hours total in a day, more than three days in a week.[1] What happens then, if an infant is irritable or crying in excess of 16 hours a day, every day? Add sleeplessness and feeding problems to the situation, and the resulting stress can disrupt the entire family unit.

Crying can be considered to be a signal of the degree of an infant's distress, but not what is causing it. If vertebral subluxation is determined to be the cause, it can be corrected, thereby changing the trajectory of an infant's life, and the family's lives as a result.

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Case Report

History

A four-month-old male with a medical diagnosis of failure to thrive was presented for care by his mother. His mother reported a quick labor and delivery with no complications.

The infant had been unusually fussy starting approximately two weeks after birth. In the first month, he began vomiting all milk after feedings. The mother took the infant to a GI specialist, and a series of tests were performed. A swallow study was negative. Sweat test, urine sample, and stool sample revealed no pathology. The patient's mother tried eight different formulas; the infant continued to have reactions.

The patient's pediatrician diagnosed him with failure to thrive. The mother found that the infant was able to drink goat's milk with maple syrup 1-2 ounces at a time and only moderately spit up, and she continued to seek answers. The child cried approximately 90% of the time unless continuously bounced, and never slept at night, only taking short naps during the day. The child had been to multiple other specialists and two other chiropractors and was scheduled for a cystic fibrosis test the following week.

Examination

Examination revealed a left-convex C-shaped posture in the neck and trunk. Right unilateral microsomia was noted. When the patient opened his mouth, his mouth and tongue deviated to the left. The right extremities showed fewer spontaneous motor movements compared to the left. The skull was asymmetrical with flattening of the left occiput. The right sternocleidomastoid was in severe spasm. The patient could not rotate his head to the right or laterally flex to the left.

Intervention and Outcomes

Precision nasium and vertex views of the cervical spine were taken. Analysis revealed a kink-type pattern with a severe rotation of the atlas posteriorly on the left. Using an Atlas Orthogonal instrument, the patient was placed on his right side with the mother stabilizing his body. The adjustment was delivered and the patient rested for several minutes. Using supine leg check analysis and palpation of the upper cervical spine post-adjustment, the patient was determined to be in alignment and the mother was instructed to bring the infant in the next day.

The next day, the mother reported a good result: the child's head was no longer laterally flexed to the right, the patient was much less fussy, and slept all night, only waking to feed. Cervical spine range of motion was within normal limits. The infant was still in alignment from the first adjustment, and the mother was instructed to return with the infant in one week. Over the course of three and a half months, the patient's atlas was adjusted 6 times. The child began to gain weight and meet milestones. Mouth and tongue deviation resolved. Within 6 weeks of the first adjustment, his body movements were symmetrical, and the right unilateral microsomia resolved.

Atlas Orthogonal Procedures were used to adjust the patient's upper cervical spine. Atlas Orthogonal technique uses specific x-ray analysis, precise measurements, and mathematical calculations to determine the best angle to correct atlas misalignment.

This technique is based on the idea that the properly aligned spine should have a level atlas separating a vertical cranium and vertical cervical spine. The atlas should sit perfectly perpendicular to cranium and cervical spine. An adjusting instrument delivers a percussive force of approximately six pounds into the flesh over the atlas transverse process. The patient often feels nothing; however, with proper patient placement and the correctly calculated vector, the force is enough to move the atlas bone into its proper alignment.[2]

Every office visit consists of a supine leg check and scanning palpation of the C1 and C2 cervical ganglia as protocol for adjustment. It has long been stated that subluxation or joint dysfunction in the upper cervical spine manifests itself in the form of postural distortions, including leg length asymmetry.[3]

Discussion

Atlas Orthogonal Technique is a very specific upper cervical technique developed from the Grostic procedure. John D. Grostic's Dentate Ligament – Cord Distortion Hypothesis explains how a misalignment of the upper cervical vertebrae can directly mechanically irritate the spinal cord, producing neurological insult. This also causes an indirect compromise of the vasculature of the spinal cord in the cervical region.

When the upper cervical region is not aligned correctly, traction occurs on the dentate ligament, causing hypoxia in the spinocerebellar nervous tract due to venous blockage. The spinocerebellar tract is largely responsible for sensory information on muscle tone, joint position, and lower motor centers to the higher centers in the brain.

A compromise can lead to increased muscle tone, hypertonicity, and a functional short leg.[4] Visible postural distortions may appear as well, such as pelvic un-leveling or a displaced center of gravity. Foot rotations may also be present.[3]

The distortion of the spinal cord occurs in both the longitudinal and transverse planes, and can alter neural function by stretching axons, therefore decreasing their diameter and conducting ability. The functional short leg is a manifestation of this neurological interference of the spinocerebellar tracts (the site of maximal mechanical irritation by the dentate ligament when the atlas is misaligned.) Research compiled that shows this tract is one of the first affected by traction on the dentate ligament, and with an understanding of anatomical structures, the leg check is a valuable indicator of when to adjust, as vertebral misalignment is not always accompanied by symptomatology.[3,4]

The ideas of Dr. Grostic are complementary to Kent's research in his review Models of Vertebral Subluxation, particularly the dysafferentation model. This model states that biomechanical dysfunction alters proper mechanoreception and nociception. Alteration in normal mechanoreceptor function then affects postural tone.

This model also discusses the importance of correcting the specific vertebral subluxation to restore normal afferent input to the central nervous system, not just manipulating for the symptomatic treatment of pain. If afferent input is compromised, efferent input is compromised as well. Restoring normal afferent input to the body allows the body to perceive itself and the surrounding environment correctly.[5]

Trauma to the occipitocervical joint is believed to be the cause of kinematic imbalance due to suboccipital strain, also known as KISS syndrome. The majority of afferent proprioceptive signals originate from the cranial-cervical junction. If an obstacle impedes these signals, there are extensive consequences in the development of the nervous system. These delicate structures undergo considerable stress during delivery, as the newborn cervical spine is insufficiently able to protect the spinal cord, vessels, nerves, and brain from traction and rotational forces.[6] Three aspects combine to render the sub-occipital region especially vulnerable: insufficient articular restriction of movements between condyles and atlas, insufficient active muscular fixation between head and trunk, and undeveloped neuro-motor control of these structures[7]

During the labor and delivery process, the infant's head is rotated about 90º and pressed against the trunk by the contractions of the uterine muscles. As a result, the majority of newborns suffer from microtrauma of the brain stem tissues in the periventricular areas. This trauma of the sub-occipital structures disrupts and inhibits the functioning of proprioceptive feedback loops. Motor development, though innately pre-programmed, does not develop automatically.

The inclination of the head is reduced if the range of motion in the atlanto-occipital joint is restricted. The rotation of the head is inhibited by a reduced atlanto-axial joint range of motion. This causes an aberrant input from the receptors to the CNS. There are some reactions which can be explained not only by the anatomical locations of the nervi glossopharyngaeus, vagus, and hypoglossus to the atlanto-occipital joint, but also by a direct connection of the afferent receptors to the nuclei of cerebral nerves such as the occulomotorius and statoaccuticus.[7]

Oftentimes, the criteria for diagnosing failure to thrive is based on body mass index, length, and weight compared to a growth chart release by the World Health Organization. Though this is a simple way to monitor an infant, these indicators alone should not be used to predict undernutrition. A myriad of criteria should be used to identify a child at risk for failure to thrive. In more than 80% of cases, medical doctors are unable to identify a clear underlying medical condition.

Due to this, they categorize failure to thrive according to calories, using a set of differential diagnoses under the following categories: inadequate caloric intake, inadequate caloric absorption, and excessive caloric expenditure. In a primary allopathic care setting, inadequate caloric intake is the most common factor, usually due to problems with feeding, or may also be due to family factors such as neglect. Laboratory testing can identify a cause of failure to thrive less than one percent of the time, and therefore is not recommended. A multidisciplinary approach to treatment is often used to improve weight gain and cognitive development. Prevention in the medical realm focused on nutritional counseling, psychosocial, and educational support for families at increased risk of failure to thrive.[8]

According to allopathic medical research, failure to thrive is not rare, occurring in up to 10% of children in primary care practices and an estimated 5% of hospitalized children.

Medical conditions leading to a diagnosis of failure to thrive can be low birth weight, premature birth, gastroesophageal reflux, or developmental delay. There is no standard set of laboratory testing recommended at this time, and the patient history and physical examination are often what lead to this diagnosis, with subsequent testing specific to the findings to rule out serious pathology.[9]

A separate but related topic in the medical model is congenital muscular torticollis. According to medical research, this is a common deformity presenting shortly after birth, and affects 4-16% of the population. Craniofacial asymmetry is a coexisting condition in up to 90% of this population. Traditional medical treatment has the best prognosis when diagnosed early, before three months of age. If untreated, craniofacial deformities, cervical spine dysmorphism, and limited cervical spine range of motion are the result, leading to more invasive interventions such as surgery or injections of neurotoxins to release the sternocleidomastoid.

Treatments with early diagnosis include a comprehensive physical therapy program with stretching of the cervical spine, strengthening of the cervical spine and trunk, and a daily intensive home program. If the diagnosis is made prior to 1 month, the average recovery time of cervical range of motion with physical therapy protocols is around 1.5 months. If diagnosed before 6 months of age, the average time for recovery is approximately 6 months. If diagnosed after the patient is 6 months old, physical therapy to recover cervical range of motion often averages 9-10 months, with fewer infants achieving a normal range of motion. In recent years, the incidence of congenital muscular torticollis and craniofacial asymmetries is rising.[10]

Conclusion

This case report described the successful outcome of upper cervical chiropractic care on an infant diagnosed with failure to thrive and KISS. Allopathic medical care was unsuccessful in helping this patient. Following the identification of vertebral subluxation, the atlas subluxation was corrected using precisely calculated vectors. The patient experienced resolution of all symptoms related to severe upper cervical misalignment. More research in this area is warranted.

References

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